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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/262,778	03/04/1999	MICHAEL J. PENBERTH	DUPONT1120-1	9973

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EXAMINER	
CHAWAN, SHEELA C	
ART UNIT	**PAPER NUMBER**
2625	10

DATE MAILED: 08/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/262,778	PENBERTH ET AL.	
	Examiner	Art Unit	
	Sheela C Chawan	2526	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 July 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. Applicant's arguments filed on July 29, 2002 (paper # 9/A) have been fully considered but are deemed to be moot in view of the new grounds of rejection .

Claim Rejections - 35 U.S.C. § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3 and 4, are rejected under 35 U.S.C. 103(a) as being unpatentable over Sipma (US.5,149,976) in view of Prior (US. 5,345,085) .

As per claims 1 and 4, Sipma discloses charged particle beam pattern generation apparatus and method for determining the position of a feature within the scan that is effective at the operating frequency of the scan and using a limited bandwidth video signal, comprising the steps of:

determining the reference feature (column 14, lines 24- 25) to be an edge over which the video signal changes abruptly from one level to a higher or lower level (column 2, lines 17- 22, column 6, lines 40- 50, column 8, lines 37- 48, column 14, lines 24-59, column 15, lines 1 - 11) ;

determining whether the beam is only turned on over a short region of the scan (column 3 , lines 8- 43) ; and

Sipma discloses charged particle beam pattern generation apparatus and method , but fails to specifically mention overlap between the beams on portion of the scan ... . However, Prior discloses a method and structure for electronically measuring beam parameters. The system comprises of :

representing the degree of overlap between the beam on portion of the scan and the higher video level part of the feature as the total video signal accumulated in that scan (column 12, lines 30- 68, column 13, lines 1-30) , as shown by Prior the use of overlap between the beam on portion of the scan and higher video level ... , thereby increasing positional accuracy determination (column 11, lines 50- 51) .

Therefore , it would have been obvious to one with ordinary skill in the art at the time of invention to incorporate the teaching the step representing the degree of overlap between the beam on portion of the scan and the higher video level part of the feature as the total video signal accumulated in that scan as taught by Prior □s into the system of Sipma in order to increasing positional accuracy determination, as suggested by Prior at (column 11, lines 50-51) .

As per claim 3, Sipma discloses charged particle beam pattern generation apparatus and method for (a) choosing a predetermined plurality of pixels of said raster scan to be calibrated (predetermined pixels sequence for establishing and for adjusting the beam dwell time by a set of predetermined increments for successive pixels , column 2, lines 53 - 68, column 7 , lines 42- 58) ;

(b) moving at least one feature at the image plane having video contrast adjacent to the landing point of said plurality of pixels (column 14, lines 28- 68). Sipma is silent about specifics details of c) strobing said beam for said plurality of pixels within said raster scan. (d) incrementally moving said plurality of pixels within said raster scan toward said at least one video contrast feature ; (e) integrating the signal resulting from said plurality of pixels as said plurality of pixels move towards said at least one video contrast feature; and (f) repeating steps (c) through (e) until said plurality of pixels crosses said at least one video contrast feature . However, Prior discloses a method of electronically measuring parameters of a beam in a

raster scan system comprising the steps of: (c)strobing said beam for said plurality of pixels within said raster scan (column 2 , lines 26- 39);

(d) incrementally moving said plurality of pixels within said raster scan toward said at least one video contrast feature (column 1, lines 30- 40);

(e)integrating (column 9, lines 3- 65) the signal resulting from said plurality of pixels as said plurality of pixels move towards said at least one video contrast feature (abstract, column 3, lines 1 - 15, column 6, lines 35- 68) ; and

(f) repeating steps (c) through (e) until said plurality of pixels crosses said at least one video contrast feature (column 5 , lines 8-25), as shown by Prior the use of strobing the beam for plurality of pixels within said raster scan because to minimize the time required to completely expose a pattern . In this manner the production rate is increased and the unit cost per mask or wafer is lowered (column 1, lines 40- 44).

Therefore , it would have been obvious to one with ordinary skill in the art at the time of invention to incorporate the teaching the step of strobing said beam for said plurality of pixels within said raster scan because to minimize the time required to completely expose a pattern . In this manner the production rate is increased and the unit cost per mask or wafer is lowered, as taught by Prior at (column 1, lines 40- 44).

3. Claims 2 and 5, are rejected under 35 U.S.C. 103(a) as being unpatentable over Sipma (US.5,149,976) in view of Prior (US. 5,345,085), as applied to the above claims 1, 3 and 4, and further in view of Abboud et al. (US.5,393,987).

Regarding claims 2 and 5, Prior discloses the method wherein the steps include:

using the high to low, low to high video transition as a reference feature (column 12, lines 30- 41) ;

unblanking (column 13, lines 8- 10) the electron beam for a short period during the scan (column 12, lines 47- 65) ;

advancing (column 2, lines 26-39) the unblank-blanked period along the line by a small increment each succeeding scan (column 2 , lines 26- 39);

sampling the amplifier (column 6, lines 35- 68, column 7, lines 1 - 28) output by an analog-to-digital converter (column 4 , lines 57- 68) at a time delay following the unblank-blanked period (column 6, lines 35- 68, column 8, lines 37- 48) , determined by the video amplifier bandwidth (column 3 , lines 16- 30, column 6, lines 35- 68, column 8, lines 37- 48, column 10, lines 12- 66);

arranging the successive samples for giving a video profile representative of the video profile of a slow scan with a wide beam (column 10, lines 42-38) ; and

mathematically processing the representative video profile to yield the position of the video edge with respect to the scan (column 10, lines 12-66) ;

a means of stepping the unblank-blanked period by increments and inserting a programmable delay between the blanking pulse generator and the blanker itself (abstract, column 2, lines 27- 39, column 12 , lines 30- 68). Prio is silent about specific details of sub pixel increments . However, Abboud discloses dose modulation and pixel deflection for raster scan lithography in which each achieve a finer effectual grid size than the actual writing grid of a raster scan system in which a combination of dose modulation and sub-pixel deflection are used (column 2, lines 42-53), as shown by Abboud the use of sub-pixel deflection is used because to optimize the integrity of the written pattern and minimize the disadvantages of dose modulation and pixel deflection (column 2, lines 44- 53) .

Therefore , it would have been obvious to one with ordinary skill in the art at the time of invention to incorporate the teaching the step of sub-pixel deflection as taught by Abboud 's into the system of Sipma in order to optimize the integrity of the written pattern and minimize the disadvantages of dose modulation and pixel deflection , as suggested by Abboud at (column 2, lines 44- 53) .

Other prior art cited

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Itoh et al. (US.5,468,969) discloses method and apparatus for electron beam lithography.

Lemelson (US.4,118,730) discloses scanning apparatus and method .

Tokumitsu et al. (US.5,526,044) discloses movement detection device and focus detection apparatus using such device .

Veneklasen et al. (US.6,274,290) discloses raster scan gaussian beam writing strategy and method for pattern generation.

Veneklasen et al. (US.5,876,902) discloses raster shaped beam writing strategy system and method for pattern generation .

Contact Information

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheela C Chawan whose telephone number is 703-305- 4876. The examiner can normally be reached on Monday through Thursday 7.30 a.m. to 6.00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta, can be reached on (703) 308 - 5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-9700.

scc
Sheela Chawan
Patent Examiner
Group Art Unit 2625
July 22, 2003

Jayanti K. Patel
Primary Examiner